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Building clean energy support with young millennials in the United States

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ABSTRACT

Young millennials will play an important role in addressing the intergenerational climate change crisis related to energy production. Drawing from the Theory of Planned Behavior and community resilience literatures, we analyzed how awareness of local clean energy initiatives, risk perceptions, environmental messaging, and environmental orientation influence young millennial support for federal clean energy policy and taxes as mediated through local clean energy support.

1. Introduction

Greenhouse gas induced climate change is an intergenerational sustainability crises, or a crisis that impacts the health, safety, and well-being of current and future generations (Theis and Tompkin, 2015). The millennial generation will play an important role in addressing this crisis. There are currently more than 83 million millennials, or individuals born between 1982 and 2000, in the United States (United States Census Bureau, 2015). As a whole the millennial generation tends to be more concerned about environmental issues (Muralidharan and Xue, 2016). Despite their concern, however, millennials tend to not engage in pro-environmental behaviors because they are unsure of what they can do (Gaudelli, 2009). According to Gaudelli (2009), "this group understands the why but is unsure about the how" (par. III).

There is a stark divide between young millennials born after 1988 and older millennials born in or before 1988 regarding environmental concerns and behaviors. We make the distinction because compared to older millennials, young millennials are: (1) understudied regarding environmental issues, (2) more aware of yet less concerned about environmental issues, (3) more technologically connected yet less money conscious, and (4) less likely to spend more money to support environmental causes (Allen and Spialek, 2018; Debevec et al., 2013; Gaudelli, 2009; Nelms et al., 2017). Strategies and interventions are needed to overcome expected hurdles with young millennials related to environmental inaction.

In order to address these issues, we propose to study policies and taxes as two methods to enact clean energy initiatives in a local southeastern community (e.g., Craig and Allen, 2014; DSIRE, 2017; Nelms et al., 2017; Sioshansi, 2013). More specifically, we analyze how awareness of local clean energy initiatives, risk perceptions, environmental messaging, and environmental orientation influence young millennial support for federal clean energy policy and taxes as mediated through local clean energy support. In subsequent sections, we overview literature and associated gaps to frame our research questions. To the best of the authors' knowledge this is the first study to explore the role of risk perceptions, environmental messaging, and environmental orientation related to young millennial support for clean energy policy and taxes.

1.1. Community resilience, clean energy policy, and clean energy taxes

Community resilience is measured by a community's ability to adapt to and recover from adverse situations utilizing available resources (Federal Emergency and Mitigation Administration. FEMA, 2016). Preparedness activities and plans within communities help to build resilience to climate change related events (Keim, 2008). Resilient communities can respond to and adapt to negative changes locally, which can build support for mitigating efforts nationally (Grothman and Patt, 2005; Norris et al., 2008).

Funding to support clean energy infrastructure is a community resilience initiative that can help local communities adapt to fossil fuel electricity generation and climate change risks. In this study, we examine a community that is actively engaged in both energy efficiency and clean energy efforts. In this case, young millennials living in the community are subject to active policy and tax implications related to clean energy. Grothman and Patt (2005) suggest a mediating relationship between adaptation efforts at the local level and mitigating efforts such as those enacted at the federal level (e.g., clean energy policy or

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taxes). Accordingly, this study explores how local support for clean energy policy and taxes can mediate the relationship between young millennial awareness, risk perceptions, environmental messaging, and environmental orientation between support for federal clean energy policies and taxes.

1.2. Theory of Planned Behavior

The Theory of Planned Behavior (TPB; Ajzen, 1991) is a micro-, individual-level theory which can be used to assess an individual's intentions to behave based on multiple influencing factors. The TPB contends that awareness, knowledge, perceptions, values, attitudes, and beliefs precede behavioral intentions, which precede actual behaviors. In a meta-analysis of 185 studies across disciplines, the TPB explained 27% of variability in behaviors and 39% in behavioral intentions (Armitage and Conner, 2001). Specific to electricity consumption by residential consumers, quantitative studies suggest that the TPB is predictive of electricity reducing behaviors and intentions (Abrahamse and Steg, 2011; Brosh et al., 2014; Chen, 2016; Lynch and Martin, 2013). While previous studies explored energy and or electricity conservation, research has not explored pro-conservation behaviors of young millennials pertaining to support for clean energy infrastructure. In response to this gap in the literature, we examine young millennial support for clean energy policy and taxes.

Consistent with the progression of the TPB, when individuals are aware of local initiatives, perceive environmentally-related risks more proximally, and or have positive attitudes towards a conservation action, the potential to enact behaviors related to pro-clean energy increases (e.g., Ajzen, 1991; Fielder, 2007; Nisbett and Strzelecka, 2017; Trope and Liberman, 2010). Combined, findings from previous TPB studies highlight the importance of enhancing awareness, engaging community members about personal and environmental risks, and building positive attitudes (i.e., positive environmental orientations) to enact actual pro-conservation behaviors (e.g., active policy and tax support).

1.3. Perceptions of community health and energy security risks

The use of clean energy infrastructure reduces negative environmental impacts (Hertwich et al., 2015) and local health risks (Varagur, 2015). Local health problems have been linked to temperature, air quality, extreme events, migration of vector-borne disease, and concentration of water-related illness (U.S. Environmental Protection Agency (EPA), 2018). Larger-scale health risks associated with climate change and natural resource degradation include increased exposure to disease, excess morbidity or mortality, and increased healthcare expenses (Allen and Craig, 2016; U.S. Environmental Protection Agency (EPA, 2018; Keim, 2008). Perceived individual health risks have been positively linked to energy conservation (Asensio and Delmas, 2015), yet perceived community health risks related to energy infrastructure have not been explored. Addressing this gap, we investigate the relationship between perceptions of community health concerns and young millennial support for clean energy policy and taxes.

Locally, clean energy projects can help communities manage issues related to energy affordability and access (i.e., energy security). Several U.S. communities adopted 100% clean energy infrastructures to increase energy availability and control costs including Aspen, Colorado, Greensburg, Kansas and Burlington, Vermont (Varagur, 2015). Unfortunately, a myriad of organizational and political hindrances have deterred the support for clean energy infrastructure (e.g., Michigan et al. v. EPA, 2015; Craig, 2018). In order to enact local clean energy policy, taxes, and build broad support for national, mitigating policy and taxes, it is important to understand perceptions of local electricity cost and availability risks.

1.4. Awareness and environmental messaging

Consistent with the TPB (Ajzen, 1991), pro-environmental behaviors are influenced by initiative awareness. Individuals who receive educational information about environmental efforts (i.e., access to information to build awareness and knowledge) are more likely to engage in pro-environmental, energy conserving behaviors (Langevin et al., 2013). Further, awareness about environmental initiatives has positively influenced support for clean energy policy, support for organizational-level efficiency, and participation in pro-conservation behaviors (Craig and Allen, 2014; Craig, 2016; Craig and Feng, 2017; Craig, 2018). Results are mixed about the direct and indirect effect of awareness about topics and pro-conservation behaviors on environmentally related behavior change (e.g., Allen, 2016; Craig, 2016; Egmond and Bruel, 2007), however, warranting further empirical attention. For instance, awareness of clean energy policy and taxes may be present, yet, enactment of behavior may be deterred (or enhanced) by individual environmental attitudes, perceptions of risk, confusion, or social pressures (e.g., Craig and Allen, 2014; Cialdini, 2003).

The manner in which a message is communicated can positively influence pro-environmental behaviors (Craig and Allen, 2014; Craig, 2018). Environmental messaging, including topical content as well as gain- and loss-framing, are explored in this study. The topical content of a message and the manner in which it is framed have demonstrated the ability to build support for pro-conservation behaviors such as energy conservation, energy efficient behaviors, recycling, and policy support (Allen, 2016; Asensio and Delmas, 2015; Craig and Allen, 2014; Sharp and Pelletier, 2008). Sharp and Pelletier (2008) outlined three behavioral change phases that communicate how to frame a message including detection, decision, and implementation. Considering the TPB, awareness is gained in the detection phase, alternative behaviors are explored in the decision phase (e.g., behavioral intentions are formed), and behavior is enacted in the implementation phase (Fig. 1).

Belief statements related to the topics of "energy" and "environment" in previous conservation studies appear to positively influence

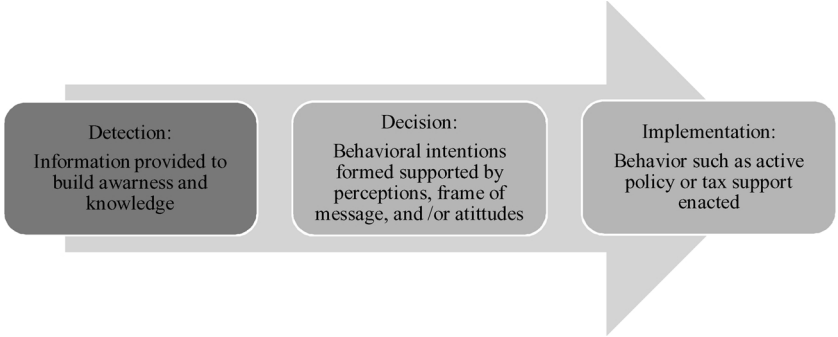
Detection:
Information provided to build awarness and knowledge
Decision:
Behavioral intentions formed supported by perceptions, frame of message, and /or atittudes
Implementation:
Behavior such as active policy or tax support enacted

Fig. 1. Sharp and Pelletier (2008) and TPB Steps to Enact Behavior.

attitudes, perceptions, and behaviors (Allen, 2016; Asensio and Delmas, 2015; Craig and Allen, 2014; Sharp & Pelletier, 2008). Energy and environment are the topics of interest in this study. The manner in which messages are framed along the behavioral phases influences individual outcomes based on the topic. Gain- and loss-framed messages show promise in engaging individuals with pro-conservation behaviors and policy (e.g., Allen, 2016; Craig and Allen, 2014; Sharp and Pelletier, 2008). When individuals are unaware or mis-informed about a topic, loss-framed messages show promise in building awareness and enhancing attitudes during the detection phase (Allen, 2016; Sharp and Pelletier, 2008). In the decision and implementation phases, the benefits of engaging in pro-environmental behaviors are typically more salient at influencing actual behavior than the potential costs or losses (Allen, 2016; Sharp and Pelletier, 2008). Studies that explore the impact of messaging for millennials related to conservation or environmental behaviors are rare, and thus are explored here (for exception see Nisbett and Strzelecka, 2017).

1.5. New environmental paradigm

The influence of environmental attitudes on environmental behaviors among millennials and young millennials has been assessed in recent studies (Allen and Spialek, 2018; Nelms et al., 2017; Nisbett and Strzelecka, 2017) using the New Environmental Paradigm (NEP) (Dunlop et al., 2000). The NEP is used in this study to operationalize millennial environmental orientation within the TPB framework to assess support for clean energy policy and taxes. The NEP measures environmental concern towards issues such as pollution, land use, and energy conservation (Lundmark, 2007) by exploring individual awareness (or lack thereof) of harmful environmental actions. The study will focus on the manner in which positive environmental attitudes (i.e., NEP orientation) can enhance support for clean energy infrastructure locally and federally.

1.6. Research questions

Based on the literature outlined above, we pose the following four guiding research questions:

RQ1: Does support for local clean energy policy and taxes mediate the relationship that young millennial risk perceptions, awareness of local initiatives, environmental messaging, and the NEP share with support for federal clean energy policy and taxes?

RQ2: What is the relationship between perceptions of community health risks and energy security risks (i.e., cost and infrastructure) with young millennial support for clean energy policy and taxes?

RQ3: What is the relationship that awareness of local clean energy initiatives and environmental message framing share with young millennial support for clean energy policy and taxes?

RQ 4: What is the relationship between NEP and millennial support for clean energy policy and taxes?

2. Methods

During fall 2015, we collected 198 completed surveys from undergraduate college students at a large southeastern university to measure support for local and federal clean energy policy and taxes. The survey was a non-randomized convenience sample. Surveys were conducted during class periods of lower-level undergraduate sustainability and public policy courses and took approximately 20 min to complete. Approval was obtained from the university's institutional review board prior to conducting the survey. At the time of the survey, a local utility organization was offering customers – both residential and commercial – the opportunity to purchase energy from solar generation, a clean energy source.

The average age of respondents was 19.8 with all but one respondent between the ages 18 and 25. Most respondents were Caucasian (79.8%), with the remaining groups consisting of African-American (10.1%), Latino (6.6%), Native American (1.0%), Pacific Islander, Native Hawaiian, or Other Pacific Islander ((2.0%), and Other (2.5%). Over half our sample identified as female (55.1%), followed by male (33.8%), and chose not to identify (11.1%). Forty two percent of respondents identified as Republican, 29.4% as Democrat, 20.3% as Independent, and 8.1% as a third party not listed on the instrument. Forty two percent of respondents were employed outside of being a student, and 60.1% of respondents lived off campus. One-way ANOVAs were run to determine if there were any significant differences in local and federal policy support based on these socio-demographic factors. The only significant differences that emerged were with political affiliation. Democrats were significantly more likely than Independents to support local policy ($F = 5.214$, $p < .01$). Democrats were also more likely to support federal policy than Independents and political parties not listed on the instrument ($F = 7.497$, $p < .001$).

2.1. Measures

We used Likert-type questions with five response categories in this study. Single-item questions are commonly used in political surveys (e.g., Coffey and Joseph, 2013), and were used in this study in addition to a previously validated scale (i.e., NEP; Dunlop et al., 2000) to gauge respondent environmental orientation. Single-item questions with response categories ranging from 1 = *strongly agree* to 5 = *strongly disagree* were used to understand millennial support for policy and taxes related to clean energy at the local level, and included the items: "I support [city] government use of clean energy for its offices and facilities," and "I would support an increase in local taxes to help pay for [city] clean energy use." Questions that gauged millennial support for clean energy policy and taxes at the federal level included: "I support federal policy for power plants to reduce greenhouse gas emissions," and "I would support a federal tax increase to help pay for clean energy infrastructure."

The question, "How likely are the following statements to increase your support for increased local taxes?" was included to gauge the most salient risk perceptions, topics, and message framing for clean energy support. Response categories ranged from 1 = *very likely* to 5 = *very unlikely*. Two single-question items were used to address individual risk perceptions about energy security, one item about costs and one about clean energy infrastructure, with response categories from 1 = *strongly agree* to 5 = *strongly disagree* including, "I am worried about increasing electricity costs," and "It is important to have a clean source of electricity." Local awareness in clean energy initiatives was assessed with the single-question item, "There are efforts in the [city] by utility companies to provide clean energy." A single-question item was used to gauge perceived community health risks, "The [city] should use clean energy to address community health concerns." Topics gauged included environment conservation and energy conservation related to clean energy infrastructure, with both gain- and loss- framing included for environment and energy. Questions included, "The [city] should use clean energy to save the environment," "The [city] should use clean energy to not harm the environment," "The [city] should use clean energy to save the energy," and "The [city] should use clean energy to not waste energy." The framed, topical messages can be conveyed as belief statements, as they state a belief or value position of the respondent.

Eight items derived from the original Dunlop and Van Liere NEP scale ($\alpha = .68$; Dunlop et al., 2000) were initially included to gauge respondent environmental orientation with response categories ranging from 1 = *strongly agree* to 5 = *strongly disagree*. While the alpha is on the borderline of acceptability, all items were included because the NEP has previously validated and is one of the most commonly used scales to assess environment attitudes. Example questions included, "I feel responsibility to deal with environmental problems," and "I have the knowledge to understand sustainability issues."

Table 1
Descriptive statistics and correlations.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1 FedTax	2.49	1.075	–												
2 LocTax	2.45	1.111	.76**	–											
3 FedPol	1.894	1.025	.53**	.47**	–										
4 LocPol	1.692	0.89	.37**	.45**	.62**	–									
5 Elec(c)	2.424	1.033	−.25**	−.18*	−0.07	−0.07	–								
6 Elec(i)	1.889	0.817	.24**	.29**	.44**	.51**	.25**	–							
7 Health	2.02	0.982	.18**	.17*	.28**	.31**	.20**	.43**	–						
8 Env(l)	1.975	1.01	.21**	.23**	.41**	.45**	0.11	.53**	.61**	–					
9 Env(g)	1.934	0.993	.31**	.32**	.46**	.47**	0.14	.55**	.70**	.84**	–				
10 Energy(l)	2.01	0.997	.24**	.24**	.48**	.43**	0.1	.48**	.52**	.75**	.68**	–			
11 Energy(g)	1.974	1.05	.27**	.29**	.50**	.46**	0.12	.50**	.56**	.77**	.74**	.87**	–		
12 NEP	2.166	0.64	.40**	.43**	.50**	.43**	−0.06	.40**	.26**	.39**	.40**	.38**	.44**	–	
13 LocAware	2.682	0.852	.27**	.25**	.38**	.25**	0.04	.18*	0.11	.15*	0.13	.17*	.26**	.24**	–

Note. n = 198; * p < .05, ** p < .01; (c) denotes costs risk, (i) denotes infrastructure risks, (l) denotes loss-frame, and (g) denotes gain-frame; FedTax = support for federal clean energy tax, LocTax = support for local clean energy tax, FedPol = support for federal clean energy policy, LocPol = support for local clean energy policy, Elec (r) = perceived electricity cost risks, Elec (i) = perceived electricity infrastructure risks, Health = perceived community health risks, Env (l) = loss-framed, environmental message, Env (g) = gain-framed, environmental message, Energy (l) = loss-framed, energy message, Energy (g) = gain-framed, energy message, NEP = new environmental paradigm, and LocAware = awareness of local clean energy initiatives.

2.2. Statistical analysis

To prepare the data, eight incomplete surveys were removed. Next, skewness and kurtosis for each item in the survey were examined. Items that exceeded acceptable levels of skewness and kurtosis were removed. Principle-component factor analysis using varimax rotation was performed to determine the fit of the eight-item NEP scale (Dunlop et al., 2000). A three-factor solution emerged with component one containing five-items (eigenvalue = 2.597), component two containing two-items (eigenvalue = 1.257), and with component three containing only one factor (eigenvalue = 1.006). Reliability analysis was run on the five-item component (α = .68). The two-item component reliability analysis, however, was not satisfactory (α = .36). Only the five-item component was included in the analysis. Items omitted included: "Environmental problems make the future look hopeless," "Pursuit of sustainability will threaten jobs for people like me," and "Sustainable food options typically cost more," that had response categories from 1 = *strongly agree* to 5 = *strongly disagree*.

Descriptive statistics and correlations were calculated for each variable (see Table 1). It should be noted that 7–11 have high correlations because of the manner in which the questions were written. The items are all desirable, and a high correlation is to be expected. There is a need to include all items in the study to explore the impact of environmental messaging (i.e., topical content and gain- / loss-frame). To address each of the research questions, correlation analysis and hierarchical linear regression analysis were utilized. The three-step Baron and Kenny (1986) method to test mediation was used. Tables are organized into the three steps to demonstrate the Baron and Kenny method. In Step 1, independent variables are regressed against the dependent variable (e.g., support for federal policy and taxes), in Step 2 the independent variables are regressed against the suspected mediating variables (e.g., support for local policy and taxes), and in Step 3 the suspected mediating variable is added to the regression equation as an independent variable. If a significant relationship exists in the first and second steps for independent variables, but then becomes insignificant in the third step this indicates a fully mediated relationship. If the relationship is still significant, but the amount of variability explained decreases, this indicates a partially mediated relationship.

3. Results and analysis

We organize our results via the proposed research questions. Following, we discuss broader implications for the findings.

3.1. Research question 1

The first research question asked about the mediating role of millennial local support for policy and taxes. The independent variables of interest included community health and energy security risks (i.e., cost and infrastructure), awareness of local clean energy initiatives, NEP orientation, and environmental message framing. Using hierarchical linear regression and the Baron and Kenny (1986) three-step method, significant direct effects, partially mediated effects, and fully mediated effects emerged (See Tables 2 and 3).

Table 2
Hierarchical regression analysis for the mediating role of support for local policy on federal policy.

Step and Variable	B	SE	β	t	p
Step 1 (Adj. r^2 = .431)					
NEP (Adj. r^2 = .151)	0.409	0.1	0.255	4.085	0.000
Energy(l) (Adj. r^2 = .094)	0.263	0.065	0.256	4.06	0.000
LocAware (Adj. r^2 = .056)	0.298	0.067	0.247	4.428	0.000
Elec(i) (Adj. r^2 = .016)	0.26	0.083	0.207	3.117	0.002
Elec(c) (Adj. r^2 = .017)	−0.147	0.056	−0.148	−2.608	0.010
Step 2 (Adj. r^2 = .401)					
Elec(i) (Adj. r^2 = .270)	0.389	0.077	0.358	5.044	0.000
NEP (Adj. r^2 = .067)	0.253	0.089	0.183	2.846	0.005
Elec(c) (Adj. r^2 = .025)	−0.159	0.05	−0.186	−3.194	0.002
Env(g) (Adj. r^2 = .025)	0.186	0.061	0.208	3.048	0.003
LocAware (Adj. r^2 = .014)	0.14	0.059	0.135	2.361	0.019
Step 3 (Adj. r^2 = .503)					
LocPol (Adj. r^2 = .378)	0.443	0.069	0.383	6.409	0.000
NEP (Adj. r^2 = .060)*	0.304	0.094	0.19	3.251	0.001
LocAware (Adj. r^2 = .036)*	0.276	0.066	0.229	4.204	0.000
Energy(l) (Adj. r^2 = .029)	0.197	0.059	0.192	3.362	0.001

Fully Mediated Variables	BI	t	p
Elec(c)**	−0.056	−1.093	0.276
Elec(i)**	0.025	0.393	0.695

Note. * p < .05, ** p < .01; Step 1 dependent variable Federal Policy; Step 2 dependent variable Local Policy; Step 3 independent variable Federal Policy with Local Policy included as independent variable in the regression equation; BI denotes "Beta In" and can be treated as possible Beta values, though they are not included in the model; * denotes partial mediation and ** denotes full mediation; (c) denotes costs risk, (i) denotes infrastructure risks, (l) denotes loss-frame, and (g) denotes gain-frame; only significant relationships from the regression equation were reported.

Table 3
Hierarchical regression analysis for the mediating role of support for local taxes on federal taxes.

Step and Variable	B	SE	β	t	p
Step 1 (Adj. r^2 = .285)					
NEP (Adj. r^2 = .151)	0.436	0.115	0.26	3.804	0.000
Energy(l) (Adj. r^2 = .049)	−0.285	0.064	−0.274	−4.453	0.000
Env(g) (Adj. r^2 = .038)	0.458	0.123	0.423	3.735	0.000
LocAware (Adj. r^2 = .033)	0.253	0.079	0.2	3.207	0.002
Env(l) (Adj. r^2 = .014)	−0.266	0.12	−0.249	−2.214	0.028
Step 2 (Adj. r^2 = .261)					
NEP (Adj. r^2 = .186)	0.53	0.12	0.305	4.421	0.000
Env(g) (Adj. r^2 = .022)	0.23	0.076	0.206	3.02	0.003
Elec(c) (Adj. r^2 = .032)	−0.215	0.067	−0.2	−3.192	0.002
LocAware (Adj. r^2 = .021)	0.208	0.083	0.16	2.52	0.013
Step 3 (Adj. r^2 = .594)	0.691	0.046	0.714	14.888	0.000
LocTax (Adj. r^2 = .577)					
Elec(r) (Adj. r^2 = .011)	−0.13	0.048	−0.125	−2.694	0.008
LocAware (Adj. r^2 = .006)*	0.121	0.06	0.096	2.024	0.044

Fully Mediated Variables	BI	t	p
NEP**	0.067	1.303	0.194
Env(g)**	0.095	1.948	0.053

Note. * $p < .05$, ** $p < .01$; Step 1 dependent variable Federal Taxes; Step 2 dependent variable Local Taxes; Step 3 dependent variable Federal Taxes with Local Taxes included as independent variable in the regression equation; BI denotes "Beta In" and can be treated as possible Beta values, though they are not included in the model; * denotes partial mediation and ** denotes full mediation; (c) denotes costs risk, (i) denotes infrastructure risks, (l) denotes loss-frame, and (g) denotes gain-frame; only significant relationships from the regression equation were reported.

For policy, millennial NEP and awareness of local clean energy initiatives were partially mediated through support for local policy, and perceived energy risks in terms of cost and infrastructure were fully mediated (see Table 2). Millennial perceptions about electricity cost risks and infrastructure were significantly related to support for federal policy in Step 1 (Adj. r^2 = .017; Adj. r^2 = .016) and local policy in Step 2 (Adj. r^2 = .025; Adj. r^2 = .270), yet became insignificant when support for local policy was included in Step 3. Likewise, millennial NEP orientation and awareness of local clean energy initiatives were partially mediated, explaining 15.1% and 5.6% (Adj. r^2 = .151; Adj. r^2 = .056) of the variability in support for federal policy when support for local policy was not included in the regression equation, then only explaining 6.0% and 3.6% (Adj. r^2 = .060; Adj. r^2 = .036) of the variability when it was included.

For taxes, the relationship between awareness of local clean energy initiatives and support for clean energy taxes was partially mediated through support for local clean energy taxes, and millennial NEP orientation and the environmental, gain-framed message (i.e., belief statement) were fully mediated (see Table 3). Both millennial NEP orientation and the gain-framed, environmental message were significantly related to support for federal taxes in Step 1 (Adj. r^2 = .151; Adj. r^2 = .038) and local taxes Step 2 (Adj. r^2 = .186; Adj. r^2 = .022), yet became insignificant when support for local taxes was included in Step 3. Likewise, local awareness in clean energy initiatives was partially mediated, explaining 3.3% (Adj. r^2 = .006) of the variability in support for federal tax when support for local tax was not included in the regression equation, then only explaining .6% (Adj. r^2 = .006) of the variability when it was included.

3.2. Research questions 2, 3, and 4

The remaining research questions asked about the relationships that millennial perceptions of community health and energy risks, awareness of local clean energy initiatives, and NEP shared with clean energy policy and taxes. Correlation analysis indicated significant relationships between support for federal policy and each of the variables of interests except perceptions of electricity cost risks ($r = -.07$, $p > .05$; see Table 1).

To further explore the research questions, hierarchical regression analysis was conducted using the three-step Baron and Kenny (1986) method (see Tables 2 and 3). For both policy and taxes, the mediating model in the third step explained the most variability, suggesting the best-fit. In the best-fit model for millennial support for federal clean energy policy, the four items of support for local clean energy policy, individual NEP orientation, local awareness in clean energy initiatives, and the energy, loss-framed message were included. These four variables explained 50.3% (Adj. r^2 = .503) of the variability in individual support for federal policy for clean energy, explaining 37.8% (Adj. r^2 = .378), 6.0% (Adj. r^2 = .060), 3.6% (Adj. r^2 = .036), and 2.9% (Adj. r^2 = .029), of the variability, respectively. For millennial support for federal taxes, three items including support for local clean energy taxes, perception of electricity cost risks, and local awareness of clean energy initiatives significantly explained variability in support for federal clean energy taxes. These three variables explained 59.4% (Adj. r^2 = .594) of the variability in individual support for federal taxes for clean energy, explaining 57.7% (Adj. r^2 = .577), 1.1% (Adj. r^2 = .011), and .6% (Adj. r^2 = .006) of the variability, respectively. Perceptions of community health risks did not exhibit any significant relationships during regression analysis.

Regarding policy, the two energy security risks items related to costs and infrastructure were both fully mediated through local support for policy. Awareness of local clean energy initiatives was partially mediated through local support for policy. In terms of environmental messaging, the loss-framed energy message was directly related to support for federal policy (Adj. r^2 = .094) and the gain-framed, environmental message was directly related to support for local clean energy policy (Adj. r^2 = .025, $p < .01$). Millennial NEP orientation and local awareness of clean energy initiatives both exhibited relationships that were partially mediated through local clean energy policy.

Regarding taxes, the relationship between millennial awareness of local clean energy initiatives and federal tax support was partially mediated through support for local taxes. Perceived energy security risks related to cost were significantly related to support for local taxes (Adj. r^2 = .032, $p < .01$), but did not share a significant direct relationship with federal support for taxes. The gain-framed, environmental message was fully mediated through support for local taxes, and the loss-framed environmental and energy messages shared direct relationships with support for federal taxes (Adj. r^2 = .038, $p < .001$; Adj. r^2 = .014, $p < .05$, respectively). Millennial NEP orientation (i.e., attitudes and values) was fully mediated through support for local taxes.

4. Discussion

This study provides insights into characteristics of young millennials in terms of perceptions, awareness, attitudes, and beliefs that can be leveraged within an environmental messaging framework to enhance adaptive and mitigating capacities. The research expanded the application of the TPB (Ajzen, 1991) by providing evidence of the impact that perceptions, awareness, beliefs, and attitudes have on young millennial support for clean energy policy and taxes. The research also offers support for the importance of how messages are gain- and loss-framed and how the use of certain topical content can influence policy and taxes differently. All of these factors can be utilized to enhance persuasive communications among young millennials to build widespread support for the implementation of clean energy initiatives, such as progressive policy and taxes. The importance of the study and its findings are highlighted by the facts that there are many cost-effective renewable clean energy infrastructure options (e.g., Fakhry, 2017), yet,

recent administrative actions in the United States have deterred sustainable generation infrastructure (e.g., The White House, 2017).

The presence of local policy and tax support by young millennials as a mediator between federal support is a key finding and demonstrates the broader role of community-level resilience activities in supporting larger-scale, mitigating activities. For policy, the most interesting finding is that millennial perceptions of electricity risks in terms of cost and infrastructure were fully mediated through the support for community-level clean energy policy. Consistent with assertions by Grothman and Patt (2005), this finding suggests that local involvement (i.e., support for community-level policy initiatives) can build support for mitigating, federal policy. Young millennial NEP orientation, or their environmental attitudinal orientation, was partially mediated through local support for clean energy policy. Further, millennial environmental attitudes partially enhanced support for federal policy when they support local policy. The partially mediated relationship also indicates that there is a partial direct effect, or that environmental attitudes are also directly related to millennial support for federal policy. Likewise, awareness of local clean energy initiatives was partially mediating, highlighting the importance of community awareness at garnering support for clean energy both locally and federally.

For taxes, we found that both millennial NEP orientation and the gain-framed, environmental messages (i.e., that the local community should use clean energy to save the environment) were fully mediated through local support for clean energy taxes. Local awareness of clean energy initiatives was partially mediated through local support for clean energy taxes. Combined, our results suggest that environmental orientation (i.e., NEP) and beliefs about benefits of clean energy framed as beneficial to the environment are the most salient mediating indicators of federal tax support. As noted by Sharp and Pelletier (2008), with increased awareness and progression towards the implementation of a behavior (e.g., actively supporting policy), the positive benefits related to gain-framed messages (e.g., saving the environment from the use of clean energy) become more salient.

4.1. Limitations and future research

This study has several limitations. First, we employed a cross-sectional, non-random convenience sample among college students at a southeastern university. Second, we included just 198 completed surveys, and finally used single-item questions (aside from the NEP scale). However, this study was exploratory, and is one of the first to examine clean energy taxes, policy, and risk perceptions related to energy security and community health, making it necessary to create new items and to use single items.

Future studies should build upon the questions and methods used here to create multi-question items to more thoroughly assess individual perceptions and support for clean energy policy and taxes. Perceived barriers to policy and tax support could be examined in future longitudinal research by examining reported respondent policy voting behavior over time. Social norms could also be included in the future to explore the role of social pressure or nudges in energy related actions and behaviors. Future studies could also introduce interventions aimed at building support for clean energy initiatives within communities, and be longitudinally assessed. We recommend that others further replicate this study with young millennials and other generational groups throughout the United States and internationally.

4.2. Implications

The political and economic nature of energy production make clean energy a fundamentally policy driven topic around the world (e.g., Phillips and Newell, 2013). As noted by Forman (2017), the increased prevalence of local energy initiatives including local generation warrant the inclusion of communities in policy decisions both large and small as it is the individuals in these communities that are ultimately impacted. The results of the study provide support for the bottom-up strategy addressed by Forman (2017), in that individuals in the study area were more supportive of local tax and policy for clean energy, which in turn resulted in support for mitigating efforts at the federal level. With documented resistance for clean energy in the U.S., the study demonstrates how young millennials in local communities can act now to address climate change issues, while also building further support for large-scale clean energy policy (Howe et al., 2015).

5. Conclusion

This study addressed the salient gap in the literature related to the role of young millennials with clean energy initiatives both locally and federally. The study demonstrates that support for taxes and policy, two of the most studied interventions to implement clean energy infrastructure, fully mediated the relationship with millennial support for federal, mitigating efforts. The study highlights the need of young and future generations, namely young millennials, to engage with clean energy in their communities and beyond to address the sustainability development goal of energy access for the world's population. In terms of application, the findings support the notion of using persuasive attempts locally to build support for clean energy initiatives to adapt. This involvement in turn is strongly and significantly related to the support for macro-level, mitigating efforts.

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